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ABSTRACT

This study was a joint undertaking of interior environmental designers and a child developmentalist. The goal of the study was to increase peer interation between children in two classes held in one classroom. Children were observed for 7 weeks, in three periods: weeks 2 and 3 (time 1); weeks 4 and 5 (time 2); and weeks 6 and 7 (time 3). Observers noted children's location in activity areas, affect, degree of social involvement, and verbalization. Observations at times 1 and 2 indicated a low level of social interaction among children, and a reliance on the presence of the head teacher. Between weeks 5 and 6, the classroom was redesigned to provide open vistas so that children could scan the entire room without interrupting their play. Distracting items, such as unnecessary shelving and bulletin boards, were removed. After the observations at time 3, results indicated that there was no difference in types of play between time 1 and time 2. There was, however, a difference in amount of interactive play between time 3 and the earlier times. There was no change in verbal behavior directed to peers. One of the classes showed a difference in pattern of use of activity areas in time 3 compared to times 1 and 2. (BC)

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FACILITATING TODDLER INTERACTION THROUGH INTERIOR ENVIRONMENTAL DESIGN IN A CHILD CARE SETTING

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The study I am about to present is multi-disciplinary. It was a joint undertaking of interior environmental designers and a child developmentalist. In that sense, it is non-traditional, but in another sense, it is ultra traditional for the telling is much like a fairy tale which always ends with "and they lived happily ever after." If you will indulge me I should like to begin with "once upon a time" to give you some background - the setting for the study.

Once upon a time there was a cooperative preschool that operated both as a training site for student teachers and as a research facility on the campus of Syracuse University. The classrooms conformed to the typical arrangement with activity areas created by low storage units and walls - providing block corners, housekeeping corners, reading corners, and tables for manipulative and art activities. The school subscribed to a constructivist philosophy and adhered to the guidelines set forth by NAEYC for Developmentally Appropriate Practices in Early Childhood Programs Serving Children from Birth Through Age 8 (Bredekamp, 1987). Everything seemed fine until the wicked witch arrived disguised as a researcher and noticed that the staff had adopted an attitude toward childhood reminiscent of one described by Philippe Aries (1962) as "a repository of customs abandoned by adults." As a result, the school had become a victim of the early childhood educators' disease of saving and collecting. It seemed timely to consider the potential influence of the physical environment on the children and to redesign the existing space.

Due to some resistance on the part of the preschool staff and parents, it was agreed that the aim of the study would be limited to the enhancement of existing program goals. The two toddler classes were targeted for study because the room was not used in the afternoon which gave easy accessibility and the head teacher was experienced. She along with the director of the school identified the primary goals for the toddler program which are 1) to increase peer interaction and 2) to facilitate language development. Increasing peer interaction became the primary goal of the study for it seemed the more responsive to environmental variation, and it was believed that language development would naturally follow.

As both toddler classes used the same classroom, one meeting on Monday & Wednesday, and the other on Tuesday and Thursday, an interrupted time series design with replication was selected, given that a relatively permanent modification of the classroom environment was planned which prohibited the use of one class as a control group. There were 12 children (5 boys and 7 girls) enrolled in the Mon-Wed program and 12 children (6 boys and 6 girls) enrolled in the Tues-Thurs program. The mean age of the children was 32 months with a range from 27 to 36 months at the time of the study. English was not the native language for half of the 24 children. Each class met from 9:00 until 11:30 a.m. and was staffed by a head teacher, two student teachers, and a cooperating parent resulting in a one to three adult-child ratio.

The children had been participating in the program for four months.

The children were observed for seven weeks with the environmental modification occurring between weeks five and six. This allowed for testing for maturational changes associated with this age range and with the children's gaining greater familiarity with one another and the program, Time 1 (weeks 2 & 3) vs. Time 2 (weeks 4 & 5) and permitted a pre-post comparison Time 2 (weeks 4 & 5) vs. Time 3 (weeks 6 & 7). Week one was used to establish observer reliability.

An annotated floor plan of the classroom was generated through the use of the IBMCAD software program to record the location of the children and adults in the classroom and to assess the use of space at preselected times during the free play activity period (See Figure 1). Each child was observed three times each day noting his/her location in one of the 11 permanent activity areas (A manipulative toys, B reading, C housekeeping, D writing, E blocks, F art, G science, H snack, I easel, J sandbox, K teacher storage), affect (whether positive, negative or neutral), degree of social involvement (solitary, observer, parallel, interactive) and whether the child was verbalizing or not. In all, there were 36 observations for each of the four child variables. The location of the four teachers was also noted as was their behavior, but will not be reported here.

The plan for the physical modification of the classroom was based on the observational data collected during weeks two through five (Time 1 and Time 2) with the aim of enhancing the program goals. Looking only at the frequencies, the data revealed that the goal of promoting peer interaction was not being adequately met as the frequency of social exchanges between the toddlers was extremely low, in fact, almost nonexistent (see Figure 2). Research in the past decade has documented the capability of toddlers to interact with one another, but given 11 relatively separate activity areas for 12 children, it was not entirely unexpected. It was also evident from the observations that these toddlers had been unable to remain at an activity when the teachers were not visible. This suggested that the traditional nursery school classroom arrangement which had been originally developed for three- and four-year-olds was inappropriate for these younger children. The activity areas created by low storage units and walls provided too much environmental protection which was distracting and unsettling and caused an unreasonable amount of movement with the children following the teachers about. This added to the distractions in a room with an overabundance of visual stimulation present and heightened feelings of discomfort.

To increase the visual salience of the toddlers for each other, we drew on the aesthetic of Alexander Calder's mobiles. We viewed the children attired in colorful outfits and in relatively constant motion in the classroom as the brightly colored moving shapes of a Calder mobile that is shown to best

advantage suspended in an airy space against a neutral background. To create such an environment some furnishings had to be removed and the remaining furnishings painted a neutral color.

Based on child development theory, it seemed that although these very young children had been able to separate from their mothers, the head teacher functioned as a surrogate attachment figure. She provided a secure base for the children to explore, being the most familiar figure available. The student teachers were relatively new and the assisting mother varied from day to day. The children seemed to need to know of the head teacher's whereabouts at all times.

Keeping the above in mind, activity areas were redesigned using the IBMCAD software program to provide open vistas and an elevated play space so that the children could scan all areas of the room without interrupting their play (see Figure 1). The elevated playscape was placed so that the children could also look out of the windows from its deck. Storage space was incorporated into its design. It provided an area for such gross motor activities as climbing and sliding which had not been a permanent feature of the room. The new interior environment was implemented during the spring break.

Specifically, existing curtains on the windows were removed to gain more light. Window trim, sills and frames, as well as, door trim and frames were painted to match existing off-white walls. Unnecessary shelving and bulletin boards were removed from the walls and a wide, horizontal stripe of orange was painted on the walls to tie the room together and at a height that differentiated child space from adult space. Play equipment that had not attracted the children during the observation period, such as the large doll bed and the rack of dress-ups were eliminated, along with extra tables and chairs as children appeared to prefer the floor.

When the children returned after the vacation, two more weeks of observations occurred, Time 3. The data for each of the child variables was then entered into a multivariate analysis of variance (MANOVA) program to test for differences over Time 1, Time 2, and Time 3 for each class.

These modifications succeeded in bringing about a significant change in the frequency of peer social interactions (see Figure 2). Although there were significant differences between the observed frequency of the four levels of play in both classes, there were no significant interaction effects for time between Time 1 and 2. There was a significant multivariate interaction between levels of play and time between Time 2 and Time 3 for both classes, $F(3,20) = 3.44$, $p = .0364$, $F(3,20) = 9.93$, $p = .0003$ for class 1 and class 2, respectively. The univariate analyses revealed a significant increase in interactive play for class 1, $F(1,22) = 8.19$, $p = .0091$ and class 2, $F(1,22) = 27.56$, $p = .0001$, and, additionally, a significant decrease in solitary

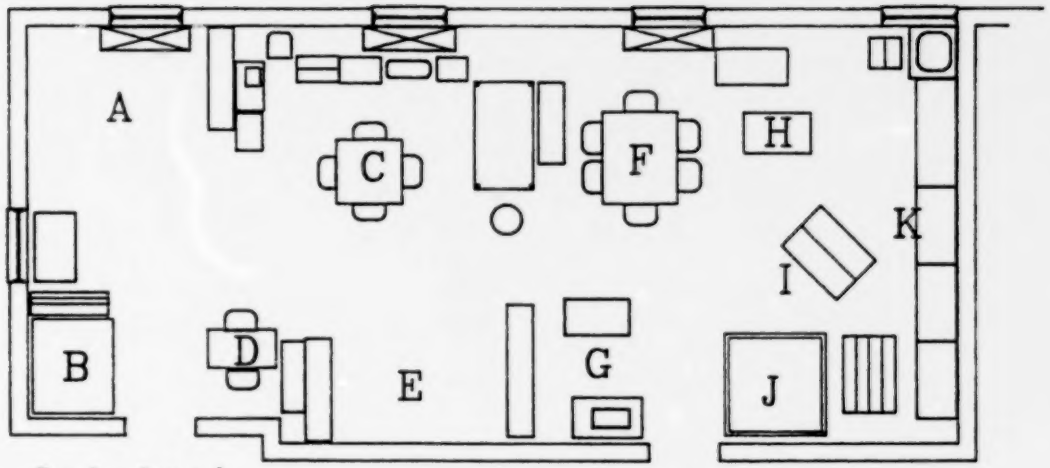
play for class 2, $F(1,22) = 5.63$, $p = .0269$. Social exchanges among the toddlers rose from less than 1% to 22% and 18% of the observations demonstrating the potential of the interior environmental design to mediate the expression of social influences.

Briefly, there was no change in verbal behavior directed to peers which remained very low. This may have been due to English being a second language for so many of the children. Perhaps if we had continued the observations for a longer period, we may have found more verbal interactions.

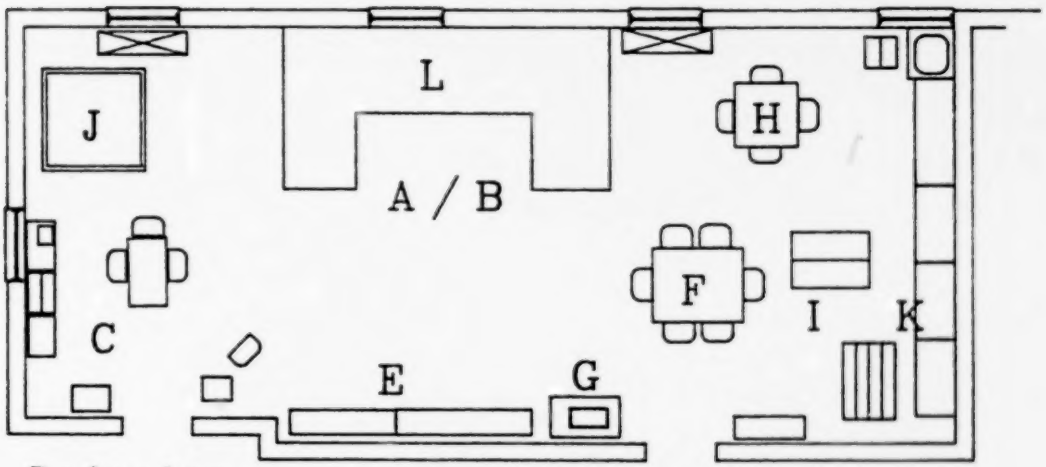
Both classes showed increases in positive affect from Time 1 to Time 2, $F(2,21) = 6.42) = p = .0067$, $F=(2,21) = 5.72$, $p = .0104$ and from Time 2 to Time 3, $F(2,21) = 3.27$, $p = .0531$, $F(2,21) = 9.41$, $p = .0012$, for class 1 and 2, respectively. These increwsing trends appear to be a maturational effect as children became more familiar and comfortable in the nursery school over time, rather than an outcome of the environmental modification.

It is difficult to detect a pattern in the use of the classroom space - much seems to depend on the daily activities presented. There were no significant differences for time in class 1 and class 2 before the redesign. However, after the room was changed, there was a significant difference, but only for class 2, $F(10,13) = 9.66$, $p = .0002$. Inferences about the causal link between the room redesign and the daily activities are not proposed.

The "happy ending" is that soon after the redesign, the other four classroom teachers began removing the curtains and non-essential furnishings and finally, one year later, all of the furnishings have been painted a neutral color and everyone lives happily ever after, including the researcher.



Original



Redesign

A: manipulative toys
B: reading
C: housekeeping
D: writing
E: blocks
F: art activity
G: science
H: snack
I: easel
J: sand box
K: teacher storage
L: raised playscape

Legend

Fig 1. - Original and redesigned room layouts

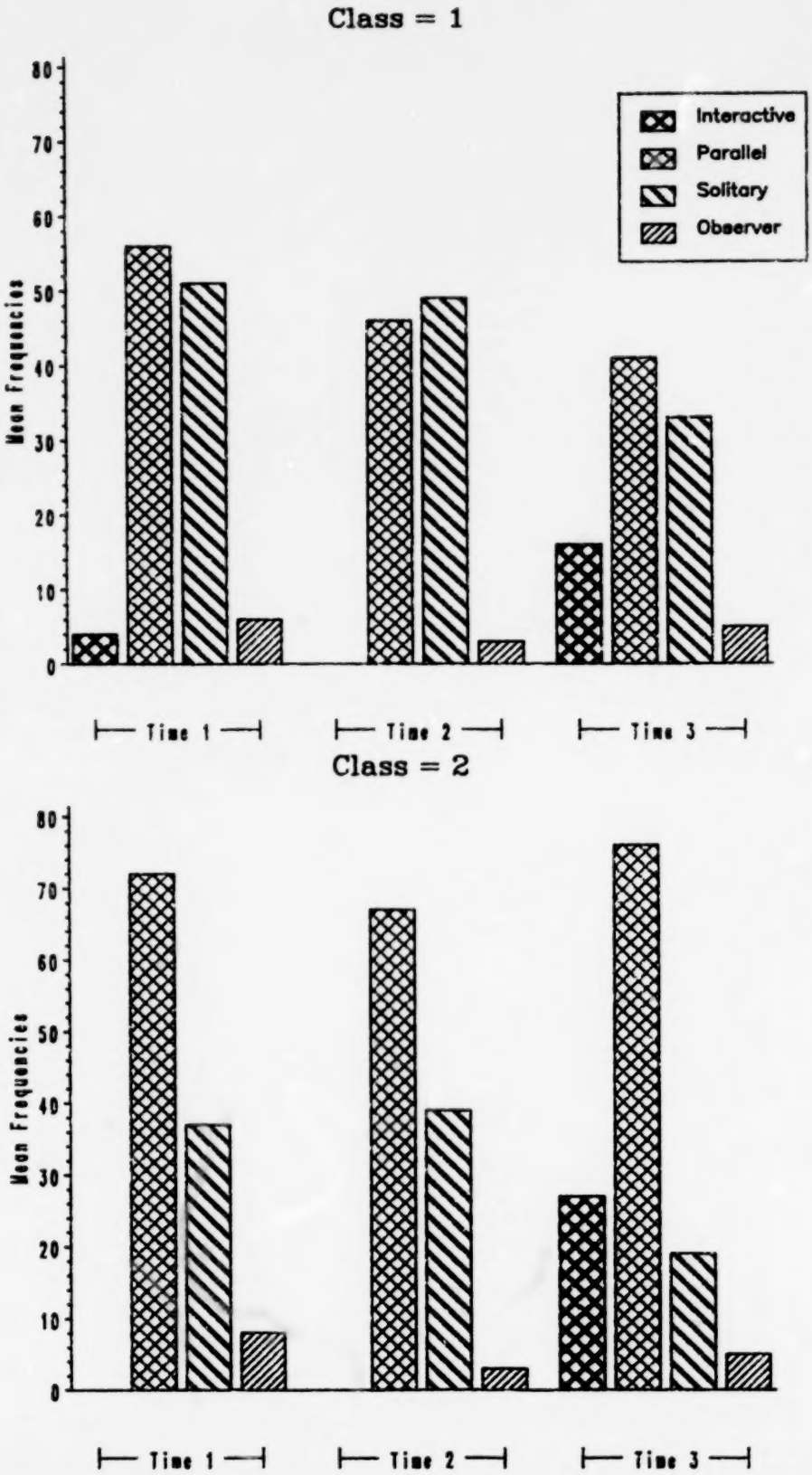


Figure 2. Mean Frequency of Play Patterns at three different time periods for Classes 1 and 2